

# COMPILER APPARATUS AND METHOD FOR OPTIMIZING LOOPS IN A COMPUTER PROGRAM

## ABSTRACT OF THE DISCLOSURE

5 A profile-based loop optimizer generates an execution frequency table for each loop that gives more detailed profile data that allows making a more intelligent decision regarding if and how to optimize each loop in the computer program. The execution frequency table contains entries that correlate a number of times a loop is executed each time the loop is entered with a count of the occurrences of each number during the execution of an instrumented instruction stream. The execution frequency table is used to  
10 determine whether there is one dominant mode that appears in the profile data, and if so, optimizes the loop according to the dominant mode. The optimizer may perform optimizations by peeling a loop, by unrolling a loop, and by performing both peeling and unrolling on a loop according to the profile data in the execution frequency table for the loop. In this manner the execution time of the resulting code is minimized according to  
15 the detailed profile data in the execution frequency tables, resulting in a computer program with loops that are more fully optimized.